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AND

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OPERATIONS ANALYSIS

Air Training Command

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13. ABSTRACT

The objectives were: (1) determine the cost of trained personnel requirements (TPR) fluctuations; (2) identify authorization tolerances with which the MAJCOMS could live; (3) identify areas of responsibility in the TPR environment; and (4) propose solutions that would enable Air Force and ATC to reduce TPR turbulence.

The principal cost of TPR turbulence is associated with technical training enlisted instructors. Additional costs, in the form of loss of investment, are incurred when training has been rendered but is no longer needed. Costs associated with base operating support and contract services are considered negligible when compared with instructor turbulence costs. Total dollar cost attributed to TPR variations in FY 76 is about $8.8 million. An additional cost in mission degradation associated with undermanning was found to be 262 man-years.

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ABSTAINER

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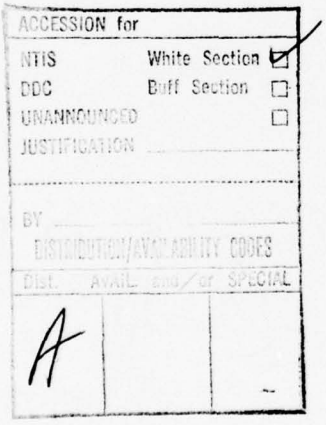

SUMMARY

Variations in trained personnel requirements (TPR) present a problem that has plagued both the Air Staff and the training community since the inception of the Air Force. The enigmatic quality of this problem is readily perceived from the many attempts and consequent failures to sufficiently reduce TPR fluctuations.

This study, which was requested by the ATC Commander, addresses the cost impact of TPR turbulence in the enlisted force and examines the TPR environment. With respect to costs, attention is focused on instructors, guaranteed enlisted contracts, contracted services, and base operating support. The FY 1976 dollar cost resulting from TPR turbulence is estimated to be $8.8 million.

The TPR environment is a passive system which merely responds to manpower inputs. A transition from this reactive state to one involving management of manpower authorization changes is proposed. Specific suggestions include ATC support of the new Skills Management System, coordination and control of Air Staff and MAJCOM proposals that have a manpower impact, and earlier participation by ATC in the proposed process in order to illuminate impacts of proposed changes.

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LIST OF ACRONYMS

AND ABBREVIATIONS

AFM	Air Force Manual
AFP	Airman Force Program
AFSC	Air Force Specialty Code
ASKIF II	Airman Skill Force Model II
BOS	Base Operating Support
CAT "A" AFSC	An AFSC Requiring Formal Training
CMDS	Command Manpower Data System
DEP	Delayed Enlistment Program
FTD	Field Training Detachment
FY	Fiscal Year
FYDP	Five Year Defense Plan
GTEP	Guaranteed Enlistment Program
IG	Inspector General
MAJCOM	Major Command
PCS	Permanent Change of Station
PEC	Program Element Code
PG	Program Guidance
POM	Program Objective Memorandum
PPBS	Planning, Programming, Budgeting System
TPR	Trained Personnel Requirements

TYPE 2 COURSE	Course That is Given Only Once
TYPE 3 AFSC AWARDING COURSE	Course That Leads to an AFSC
TYPE 3 NON-AFSC AWARDING COURSE	Advanced or Supplemental Training Course That Does not Lead to an AFSC

I. INTRODUCTION

Rapid, large-scale fluctuations in trained personnel requirements (TPR) in the enlisted ranks have been a nagging problem within the Air Force and especially for ATC since the Air Force became a separate service. Many of the dramatic TPR changes have resulted in gross inefficiencies within the training community. Although this problem has received constant high level visibility as indicated by the references listed in Table 1, a satisfactory solution has not been found.

This study, initiated at the request of the ATC Commander is an attempt to find the elusive solution to TPR turbulence. The objectives established for this study are: (1) determine the cost of TPR fluctuations, (2) identify authorization tolerances with which the MAJCOMs could live, (3) identify areas of responsibility in the TPR environment, and (4) propose solutions that would enable Air Force and ATC to reduce TPR turbulence.

Throughout this report, the terms "TPR turbulence," and "training turbulence" will be encountered often. It may appear that they are synonymous terms, but there are some slight differences. TPR variations do not necessarily result in training turbulence, but the occurrence of

training turbulence in a TPR driven course implies existence of TPR fluctuations. Furthermore, the magnitude of a TPR change is by no means an accurate measure of the effect of that change upon the training community.

Table 1

VISIBILITY OF THE TPR FLUCTUATION PROBLEM

DATE	
1952	The validity with which we determine trained requirements is a matter of grave concern to the Air Staff (Ltr, AF/PTR to AF/PDP)
1956	There is no central control of manpower authorizations by AFSC (Management Analysis study, Comptroller)
1963	Variations in trained personnel requirements have created unwarranted management problems (Ltr, Commander ATC to HQ USAF)
1965	Fluctuations in trained personnel requirements should be investigated and a determination be made whether it is possible to eliminate them (Sec of AF Ltr to Asst M&RA)
1965	Instability of the TPR causes ineffective use of resources (ATC Study to Sec of AF)
1968	Our primary problem in reducing TPR fluctuations is instability of manpower requirements by AFSC (Ltr, Gen Bell to Gen Dusard)
1970	Variations in student loads were caused by fluctuating trained personnel requirements and result in uneconomical use of resources (IG Rep of Keesler AFB)

II. BACKGROUND

Overview of TPR Construction

Considerable work goes into the construction of every issue of the TPR. To determine future Air Force requirements for trained enlisted personnel in each Air Force Specialty Code (AFSC), the enlisted members holding that AFSC are aged via computer simulation. The resulting force size is then compared to an estimate of future skill requirements. If projected requirements exceed projected available resources, training of additional people is required. If the converse applies, retraining becomes necessary. This exercise culminates in the construction of a new TPR, which is usually published quarterly, or a TPR change. It should be understood, however, that the above is a simplified description of the TPR process. Additionally, one should not assume that TPR construction is a purely mechanical operation. As will be shown in Section V, judgmental factors are inserted into the system.

A concise definition of the TPR is included in the foreword to each TPR document. This definition along with a statement concerning TPR fluctuations has been extracted from the September 1975 TPR.

> The Airman Trained Personnel Requirements (TPR) is a statement by the Director of Personnel Programs, Headquarters USAF, of the number of airmen to be trained/ retrained to meet requirements during the current and three subsequent fiscal periods (fiscal period 7T included). It also identifies Air Force needs by specialty.
>
> In the current environment, these requirements are subject to drastic short-range changes. Therefore, maximum flexibility to meet these anticipated changes must be maintained. Revisions to stated training requirements will be issued immediately upon notification of force changes affecting these requirements.

Previous Studies and Actions

As stated in the introduction, the problem of training turbulence has received considerable exposure. During the 13 year period, 1952 to 1965, this problem was studied intensely by a number of groups. The initial effort was a product of the Vice Chief of Staff's Board on Utilization of Resources(8) which, in part, was devoted to the problems of induction, training, and distribution of basic and apprentice airmen. This action was followed by an ATC staff study(6) which initiated the TPR system (1954). In October of 1956, the Directorate of Management Analysis, HQ USAF, completed a study entitled, "Analysis of Procedures for Developing Training Requirements"(2). In February 1958, the Assistant Deputy Chief of Staff, Personnel, HQ USAF,

directed that an Ad Hoc Committee for the Improvement of Technical Training Program Data(4) be established. In December 1958, HQ ATC completed a study entitled, "A Study of USAF Programming Procedures and Their Impact on Air Training Command"(9). The ATC Path Finder Study Group(5) which concluded its research in 1962, devoted a major segment of its efforts to training management. A management inspection(7) of ATC in 1963 by the Office of the Inspector General addressed the cost impact of training turbulence. In addition to the above actions, much correspondence concerning training turbulence was shuffled between ATC and HQ USAF. Improvements which resulted from the above activities are reported in Table 2. This list of improvements was extracted from a previous ATC study(3).

Although some progress had been made in dampening TPR fluctuations, the flurry of activities from 1952 through 1965 had resulted in no significant reduction in TPR/training turbulence. A 1965 study by ATC entitled, "An Analysis of Variations in Trained Personnel Requirements and Their Impact on the Technical Training Program"(3) provides evidence of this fact, as does an April 1972 AF/DPP study called, "A Study on Stabilization of Airmen Training"(10). In addition to the above mentioned studies, correspondence continued to bounce back and forth between ATC and HQ USAF during the 1965-1976 time frame.

Table 2

SUMMARY OF MAJOR IMPROVEMENTS

RESULTING FROM STUDIES/ACTIONS

DURING THE PERIOD 1952-1965

1. Programming responsibility was moved from HQ USAF to HQ ATC.

2. Airman TPRs are furnished on a quarterly basis with a projection of requirements for three years beyond the current year.

3. Machine preparation of the TPR at HQ USAF plus machining of the PTT at ATC Headquarters has shortened the time between program cutoff and training revisions down to 3-4 months (2-3 months for TPR preparation and 1 month for PTT preparation).

4. ATC has a working agreement with Directorate of Military Personnel, HQ USAF, whereby instructors can be requisitioned ahead of the manpower cycle in courses where increases are required.

5. Air Force Automated systems for officer and airman personnel records are now being developed by HQ USAF to provide more timely personnel data in a centralized location.

6. AF/PTR (new designation AF/DPPT, HQ USAF), in furnishing loads for the USAF PG document, now gives close consideration to loads from the PTT, rather than depending on an artificial calculation based on the number of recruits scheduled per fiscal year.

7. Shredouts of AFSCs are given much more attention than in previous years, with the trend being to eliminate them unless absolutely essential.

8. Correlation among the given agencies having input responsibilities for personnel requirements information is closer than in past years.

9. The Field Training Detachment (FTD) program for providing training in the field was implemented and is available in practically every command that has major aircraft or missile maintenance requirements.

The most significant achievement since 1965 has been the development of a computer model called the Skill Projection Model (SPM). This model, developed in 1970 to project Air Force Manpower needs within each AFSC, has significantly reduced the time required to prepare a TPR document.

Current Activities

In spite of all efforts, the problem of TPR turbulence is as significant today as it was in 1952. This is evidenced by the numbers of studies or actions, in addition to this analysis, that are currently in progress. These include the Skills Management System (SMS), Airman Skill Force Model II (ASKIF II), the Command Manpower Data System (CMDS), and a RAND Corporation study on the manpower-personnel interface.

SMS is a product of the Manpower-Personnel Working Group which was established in 1974 as a result of the Chief of Staff's request to investigate the feasibility of combining some aspects of manpower and personnel. Control of MAJCOM initiated manpower authorization changes will be a primary goal or function of SMS.

ASKIF II is an update of the Skill Force Model which computes future available manpower resources. This computer model, which is an AF/DPPPN product, should be operational very soon.

The Command Manpower Data System, though not developed exclusively for the purpose of reducing TPR/training turbulence, is expected to provide indirect benefits since it is a real-time manpower information system.

The RAND study will focus on the dynamic manpower/personnel system with the objective of developing tools which might alleviate some of the difficulties arising from the interface between manpower and personnel. Completion of the RAND study is scheduled for mid-1977.

III. ESTIMATED COSTS OF TRAINING TURBULENCE DURING FISCAL YEAR 1976

This section presents an estimate of the cost to ATC which results from TPR turbulence. The discussion addresses costs associated with each of four cost centers: technical training enlisted instructor force, GTEP contracts, base operating support, and contract services.

Technical Training Enlisted Instructor Force

Turbulence costs associated with the enlisted instructor force were determined by calculating quarterly overmanning or undermanning situations within each instructor AFSC (control AFSC with a "T" prefix) at Chanute, Keesler, Lackland, Lowry, and Sheppard. In addition, PCS transfers and instructor training necessitated by overmanning and undermanning were also computed. All of these elements, except undermanning, were utilized as inputs in the estimation of costs.

To obtain overmanning and undermanning data, differences between authorized and assigned strengths were computed for each instructor AFSC at each technical training center for each quarter of FY 76. Strengths were assumed constant throughout the quarterly period.

PCS moves were included only to the extent that they

reflected variations in assigned strengths. Other PCS transfers most likely occurred but were ignored so that normal personnel turnover would be excluded from the analysis.

Instructor training was assumed to be a prerequisite for all newly assigned instructors. Thus, the number of instructors requiring this training is equal to the number of incoming PCS transfers identified by increases in assigned strength.

Table 3 employs the T423X0 AFSC in an example of how the above cost inputs were computed. Summation of the TOTALS column in Table 3 over all enlisted instructor AFSCs provides the total cost inputs which are shown in Table 4.

Table 3

EXAMPLE OF COST INPUT COMPUTATIONS

AFSC 7423X0

FY 1976

	1ST QTR	2ND QTR	3RD QTR	4TH QTR	TOTALS
Authorized Strength	37	24	26	26	N/A
Assigned Strength	33	29	26	29	N/A
Overmanning (Man-Quarters)	0	5	0	3	8
Undermanning (Man-Quarters)	4	0	0	0	4
Number of PCS Moves Out	4	3	0	0	7
Number of PCS Moves In	0	0	3	1*	4
Number Requiring Instructor Training	0	0	3	1*	4

* Assigned Strength for FY 7T was 30.

Table 4

TOTAL ENLISTED INSTRUCTOR

TURBULENCE INPUTS

TOTAL OVERMANNING (MAN-YEARS)	669
TOTAL UNDERMANNING (MAN-YEARS)	403
TOTAL PCS TRANSFERS OUT	866
TOTAL PCS TRANSFERS IN	1360
TOTAL NUMBER REQUIRING INSTRUCTOR TRAINING	1360

Monetary cost factors associated with these turbulence inputs were provided by the Cost and Economic Analysis Division of the ATC Comptroller. No cost factor, however, was developed for the undermanning situation. This particular case is measured in terms of mission degradation via the man-year unit of measure. It should not be treated as a cost savings since to do so would imply that either manpower standards are incorrect or that elimination of technical training would, without serious consequence, result in an overwhelming savings. The result of cost factor application is contained in Table 5.

The $12.7 million total in Table 5 represents the cost of all instructor turbulence. Further analysis (Appendix A)

revealed that TPR flucutations were responsible for no more than 65% of all instructor turbulence. Thus, the upper limit on monetary costs associated with TPR induced fluctuations within the enlisted instructor force is $8.2 million. Likewise, the undermanning or mission degradation measure has an upper bound of 262 man-years.

Table 5

MONETARY COST OF ENLISTED
INSTRUCTOR TURBULENCE

OVERMANNING	$ 8.2 MILLION
PCS MOVES	$ 2.6 MILLION
INSTRUCTOR TRAINING	$ 1.9 MILLION
TOTAL	$12.7 MILLION

The civilian instructor force has been excluded from this analysis since TPR variations do not greatly affect civilian instructors. ATC supplement to AFM 26-1 states, "Changes in instructor requirements caused by fluctuations in training loads are normally taken in military authorizations."(1)

GTEP Contracts

The Guaranteed Enlisted Program (GTEP) was begun in September 1971 and subsequently expanded as "volunteer" service became a reality. Under GTEP a recruit contracts with the Air Force for a specific AFSC. If Air Force breaks the contract, the recruit has the option of accepting a discharge or a new AFSC. GTEP is included in the Delayed Enlisted Program (DEP) which permits a new recruit to delay entry into the Air Force for up to six months.

During the period FY 4/75 - FY 3/76, 42,717 guaranteed enlistment contracts were made. Of that total, 590 were broken and only a small percentage of these took the discharge option as can be seen from Table 6. Statistics on the discharge option were not available for the DEP.

The primary cost associated with broken GTEP contracts is the loss of investment associated with training which has been provided but is no longer needed. As can be seen from Table 6, such was the case with three basic trainees and 135 technical training students.

Assuming that the basic trainees had completed BMT, which costs $1,689 per student, then investment loss for the three trainees is approximately $5,000. The loss associated with technical training students is significantly greater. All technical training students involved were

in the Morse System Operator course of study, AFSC 20731. The length of this course is 21 weeks and the cost is approximately $9,400 per student. Average training time for the 135 students was 10 weeks. The resultant loss of investment was around $600,000. Total investment loss due to broken GTEP contracts is approximately $605,000.

Table 6

NUMBER AND PERCENT OF BROKEN GUARANTEED ENLISTMENT CONTRACTS FOR THE PERIOD FY 4/75 - FY 3/76

	NUMBER	PERCENT OF TOTAL CONTRACTS	PERCENT OF TOTAL BROKEN CONTRACTS
TOTAL CONTRACTS	42,717	100.0%	----
TOTAL BROKEN	590	1.4%	100.0%
DELAYED ENLISTMENT	153	.4%	25.9%
BASIC TRAINING			
CHANGED AFSC	299	.7%	50.7%
DISCHARGED	3	.0%	.5%
TECHNICAL TRAINING			
CHANGED AFSC	135	.3%	22.9%
DISCHARGED	0	.0%	.0%

Contract Services

Contract services at the training centers are usually contracted on a per unit of service basis. The custodial service contractor, for example, receives payment based on total square feet of building space he maintains. Monetary remuneration per square foot varies in proportion to the absolute difference between programmed and actual square footage serviced in a given time period.

Programmed expenditures for contract services are determined on a yearly basis for each month of the fiscal year. If the requirement for contract services in any given month varies dramatically from programmed, the cost of services during that month may rise significantly.

Table 7 compares the initial FY 76 programmed contract expense with the May 1976 revised program. The resulting difference of $151,000, while important, is almost inconsequential when compared to the $8.2 million cost associated with turbulence in the enlisted instructor force. In addition, the $151,000 is considered to be the result of inflation rather than TPR fluctuations. Also, TPR fluctuations generally do not cause dramatic shifts in total student load. Consequently, none of the increase in contract expense was attributed to TPR fluctuations.

Table 7

CONTRACT SERVICES EXPENSE

FOR

CHANUTE, KEESLER, LACKLAND, LOWRY, SHEPPARD

	PROGRAMMED FOR FY 76 IN JUN 75 (1)	PROGRAMMED FOR FY 76 IN MAY 76 (2)	DIFFERENCE (2) - (1)
PACKING & CRATING	$ .151M	$ .166M	+$ .015M
CUSTODIAL	1.058M	1.050M	-$ .008M
REFUSE	.646M	.676M	+$ .030M
LAUNDRY & DRY CLEAN	.602M	.605M	+$ .003M
FOOD SERVICE	14.472M	14.583M	+$ .111M
TOTAL	$16.929M	$17.080M	+$ .151M

Base Operating Support

Base operating support (BOS) is not directly proportional to variations in total base population and consequently is not significantly responsive to fluctuations in student population. The number of students taking TPR driven courses usually does not exceed 50% of total base population. A comparison of year end base population, BOS population, and average daily student load (TPR courses) is shown in Table 8. Student load data were not available for FY 1974.

As was the case with contract services, BOS population changes could not be attributed directly to TPR fluctuations. As a result, any impact which TPR turbulence may have on BOS was considered to be negligible.

Summary

Having considered TPR turbulence costs associated with instructors, GTEP contracts, contract services, and base operating support, it becomes obvious that the greatest impact occurs within the enlisted instructor force. A lesser impact is felt in the Guaranteed Enlisted Program. Total TPR turbulence costs for FY 76 are estimated to be 8.8 million dollars plus 262 man-years of mission degradation due to undermanning.

Table 8

END OF YEAR BASE POPULATION, BOS POPULATION,

AND AVERAGE DAILY STUDENT LOAD

IN TPR DRIVEN COURSES

	CHANUTE			KEESLER		
	FY 74	FY 75	FY 76	FY 74	FY 75	FY 76
BASE POP	10623	10423	9921	17469	15450	16224
BOS POP	2380	2321	2254	3175	3168	3174
AVG DAILY STUDENT LOAD		4800	4000		5800	5900

	LOWRY			SHEPPARD		
	FY 74	FY 75	FY 76	FY 74	FY 75	FY 76
BASE POP	9193	9116	9884	13815	13540	13159
BOS POP	2602	2503	2512	2823	2707	2648
AVG DAILY STUDENT LOAD		2800	3400		4500	4200

IV. AUTHORIZATION TOLERANCES WITH WHICH THE MAJCOMS CAN LIVE

Whenever shortages occur in a particular AFSC, the personnel community attempts to distribute the deficit equitably to each MAJCOM on a proportion basis. A similar process occurs whenever overmanning exists, with the exception that overseas commands may not exceed authorized strengths. Hence, the number of people assigned to a given MAJCOM is not likely to be dependent on that MAJCOM's ability to absorb deviations from authorized strengths, but is rather a function of the Air Force-wide situation.

Nevertheless, an approach to determining tolerances the MAJCOMs could live with was considered. This approach involved asking each MAJCOM the percent deviations from authorized strengths with which they could live for both three month and six month periods. Gathering this information for each three-level AFSC which each MAJCOM employed would obviously have extended this study well beyond its anticipated completion date. Consequently, this approach was not implemented. A second approach which involved the use of a statistical sampling technique was developed and later discarded when data were not available.

Due to the difficulties encountered in obtaining useful data, it was decided not to pursue this objective any further.

V. THE TPR ENVIRONMENT

This section begins by providing background on the source of TPR fluctuations. An examination of procedures for implementing TPR changes follows. The current TPR environment is then analyzed and two suggestions aimed at reducing TPR fluctuations are presented.

Sources of Fluctuations

Since TPR fluctuations provided the impetus for this study, it was necessary to determine why fluctuations occur. Interviews with staff personnel in the manpower, personnel, and training communities revealed six sources of TPR turbulence (see Table 9). Of these six turbulence sources, fluctuations in requirements for a given skill was unanimously cited as the primary cause of TPR variations. There was no agreement, however, concerning the relative impact of the five remaining contributors to TPR turbulence. Thus, their ranking in Table 9 is by alphabetical order.

Changes in requirements, or authorizations, for a given AFSC can be initiated or caused by any of a number of factors. These factors can be divided into two groups--those over which Air Force may exercise control and those over which the Air Force exerts no control. Either set

Table 9

LIST OF MAJOR CONTRIBUTORS

TO TPR TURBULENCE

1. FLUCTUATIONS IN REQUIREMENTS FOR A GIVEN SKILL
2. CONTINUAL REVISION OF CAREER FIELDS
3. PERSONNEL POLICIES
4. RECRUITING FLOW
5. TPR BASED ON POM EXERCISE OF PPBS CYCLE
6. VARIATIONS IN LOSS RATE

of factors, as depicted in Figure 1, influences, directly or indirectly, requirements for a given AFSC. There is disagreement, though, on which set of factors is the major contributor to authorization changes and no data is available to support either opinion. The majority of opinions, however, favor the uncontrollable set of factors as being the principal element behind skill requirement variations.

Procedures for Change

From whatever source the authorization change may come, its impact on trained personnel requirements must be determined. The agency that is responsible for translating authorization fluctuations into TPR changes is AF/DPPPN as shown in Figure 2.

Figure 1

SOURCES OF CHANGES IN REQUIREMENTS/AUTHORIZATIONS

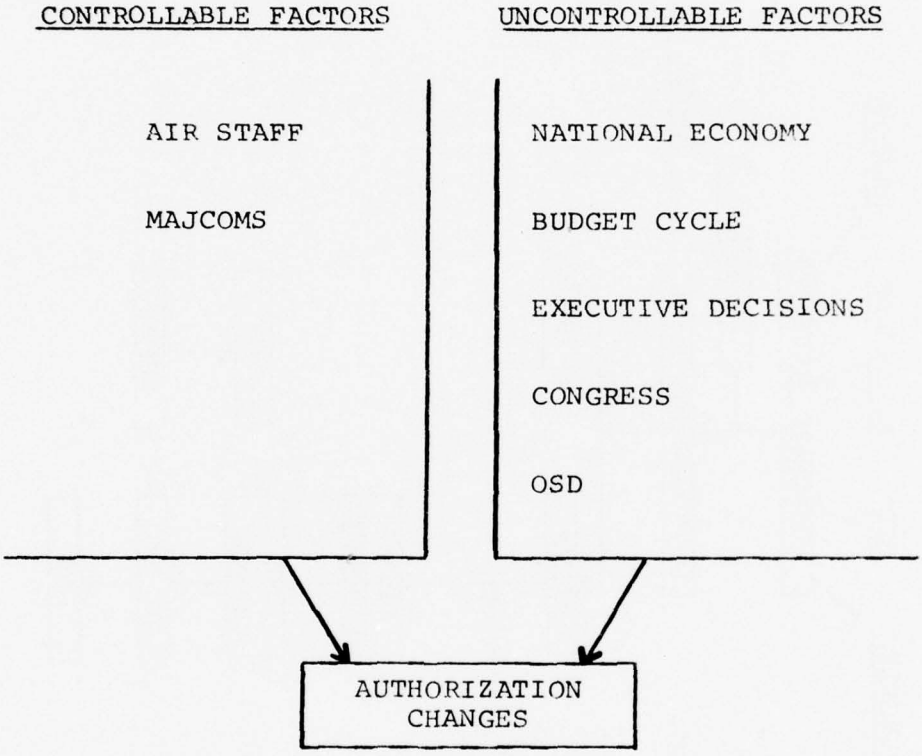
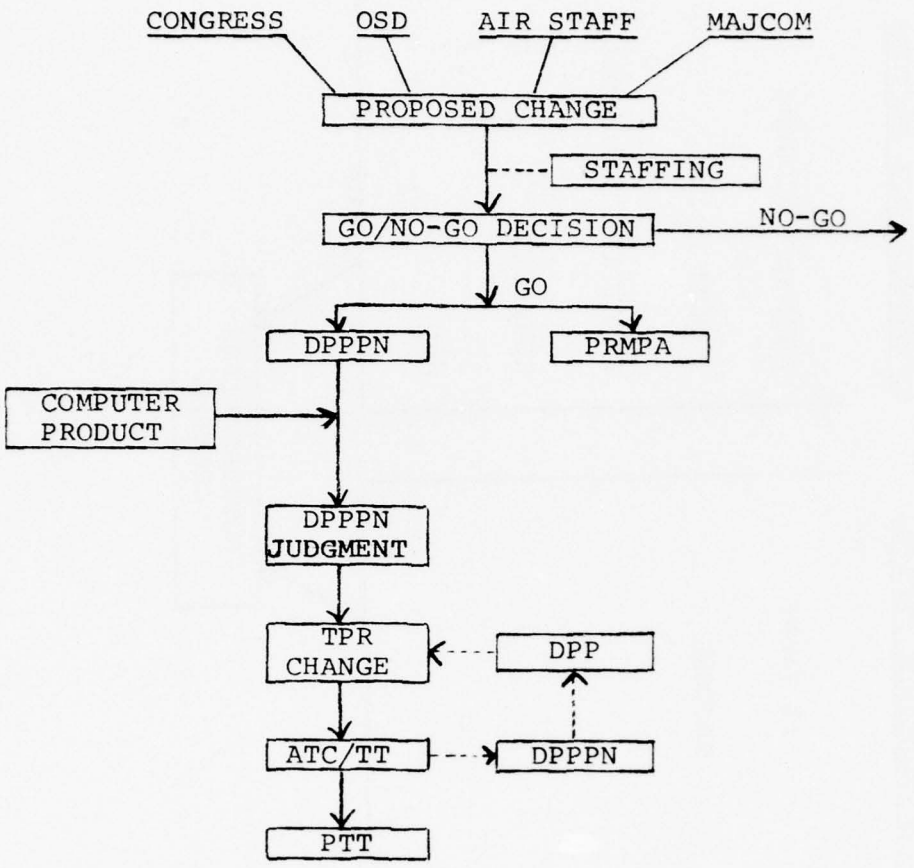


Figure 2

TPR PROCESS



A proposed change enters the system, is staffed, and an implementation decision is made. Decision authority is, of course, considerably diminished as it moves from the Congress to the MAJCOM. After a "GO" decision has been made, AF/DPPPN, with the assistance of AF/PRMPA, begins the process of updating the TPR. Depending on the magnitude of the change, various computer programs such as the Airman Force Program (AFP), Skill Force Model (SFM), and Skill Projection Model (SPM) may be used. Finally, the people in AF/DPPPN apply their own judgment and generate the TPR change which may range from a simple amendment concerning only one AFSC to the issuance of an entirely new TPR. New TPRs are usually issued, with some exceptions, on a quarterly basis. Amendments or revisions may occur at any time.

On those occasions when a new TPR is issued, a TPR conference is called to resolve any problems which TPR changes may pose to the training, recruiting, and personnel agencies. A TPR conference is necessary since training, recruiting, and personnel turbulence cannot be determined from the size of a TPR change. Upon completion of the TPR conference, ATC/TT modifies its Program Technical Training (PTT) document to incorporate all changes.

The loop at the bottom of Figure 2 shows a recent addition (May 1976) to the system. ATC/TT provides AF/DPP, via AF/DPPPN, the manpower impact of each TPR change. Whatever benefits will accrue from this modification are, at present, unknown.

System Evaluation

It should be obvious that the existing process is one of reaction to change. AF/DPPPN and ATC/TT are required to provide sufficient lead time in an environment where authorization changes are not controlled. Lead time, however, is primarily a function of authorization changes and not TPR changes. In those cases where lead time is sufficient, ATC can respond without experiencing severe consequences. Short notice changes, however, usually result in adverse effects.

Improving ATC/TT's ability to react to change will certainly allow them to absorb some of the impact of TPR turbulence, but management of change (the control of manpower authorization fluctuations) must be improved if TPR and training turbulence are to be significantly reduced. Most corrective actions that have been implemented since 1952 were actions aimed at improving reaction to change. A review of Table 2 shows this to be the case. In addition, development of the relatively new skill projection

model, although useful, has provided still another buffer between the source of TPR turbulence and those who must respond to the turbulence. Continued unilateral reliance on buffers to smooth TPR and training turbulence will, as experience has shown, result in the production of additional studies on TPR fluctuations.

The need for management of change is certainly not a new concept. A 1956 TPR study conducted by the Directorate of Management Analysis, HQ USAF(3), pointed out problem areas which clearly indicated a need for management of change. Three problem areas identified by this study were:

a. Divided responsibility at HQ USAF between Directorate of Manpower and Organization and Directorate of Military Personnel for distributing resources.

b. Lack of central control of skill authorizations, with each command being given limits on number of spaces by grade, but no limit by AFSC.

c. Short term authorizations formulated by commands without knowledge of USAF reductions made in long-range projections.

Seven years later, in 1963, the Office of the Inspector General completed a management inspection of ATC(7) and reported:

> The DOD and HQ USAF decision-making process and lack of a sound basis for orderly planning of training requirements have resulted in abrupt program changes and a substantial increase in training costs.

A follow-up inspection occurred in 1965. The Inspector General reported as follows:

> Action has not been taken by USAF to reduce out-of-cycle and unprogrammed actions which result in drastic changes to trained personnel requirements (TPR). No studies have been initiated since the ATC inspection to find improved methods or procedures for managing program changes to minimize the impact on the TPR. Moreover, analyses were not being made for each programming change which affected the TPR to focus attention on planning deficiencies and to measure costs associated with the resultant variable student loads. Actions by DOD, USAF, and MAC's [Major Air Command] continue to create large deviations in programmed training loads which impair the efficient and effective use of training resources. In many instances, however, deviations have resulted from actions by MAC's or USAF.

In addition to the above, the 1972 AF/DPP study(9) on stabilization of airman training included recommendations aimed at managing change. Among these recommendations were the following:

a. That concerted efforts be directed by all Air Staff agencies toward informing and educating Congress/OSD of the adverse and costly impacts that short-range, (mid-operating year) budget changes have on personnel procurement and training programs.

b. Achieve stability in the operating years procurement and training programs by:

(1) Maintaining the end-strength throughout the operating year (once the operating year begins).

(2) Ensuring that the beginning strength of the new Presidential budget year be the same as the end strength of the operating year contained in the apportionment program or as established by personnel programming capabilities.

c. That AF/PRM exert greater emphasis on the distribution of manpower requirements by Air Force Specialty Code (AFSC) by providing for the following:

(1) Periodic refinement and maintenance of the recently developed Skill Projection Model to ensure accurate identification of AFSC requirements associated with the total military manpower program and individual programs as contained in the Five Year Defense Plan.

(2) Identification of AFSC impacts associated with incremental changes to existing programs.

(3) Continuing analysis of AFSC requirements with a view towards evaluating trends, identifying inconsistencies, and recommending actions to achieve relative stability.

(4) Maximum structural consistency by program element and command codes between the FYDP and HAF 0-10, since the Skill Projection Model is based on the assumption that they are identical.

d. Require MAJCOM compliance with approved manpower standards.

e. Provide at least five fiscal quarters lead-time and consider phasing prior to implementing the following type actions:

(1) Military/civilian conversions.

(2) Implementation of manpower standards.

(3) AFR 26-12 proposals.

(4) Changes in AFSC distribution in the transient account.

f. Restrict realignment of authorizations to satisfy priority missions to the same Program Element Code (PEC) if five fiscal quarters of lead time cannot be provided.

g. Approve MAJCOM proposals affecting distribution of their authorizations by AFSC at Headquarters USAF.

h. Preclude the establishment of unfunded requirements not in the Air Force budget by activating/deactivating units in the same fiscal quarter.

A recent attempt at managing change occurred in 1975. On 17 March of that year, AF/DPM and AF/PRM issued a joint message(11) concerning short lead time changes in manpower authorizations. The message reads as follows:

> 1. Short lead time changes in manpower authorizations impact the ability of the personnel system to respond to authorization increases with trained personnel. Commands and SOA are therefore reminded that strict compliance with the basic time-phasing policy of AFM 26-1 remains. Further guidance is provided below.
>
> 2. MAJCOM manpower officials will project all changes to requirements by AFSC which are related to command management actions and application of manpower standards at least nine months unless advised by MAJCOM DP there would be no adverse personnel impact resulting from a shorter lead time. MAJCOM DP must assure that sufficient resources, by specialty, are available and can be assigned to the required locations.
>
> 4. If the changes involve a Category A airman AFSC (AFM 50-5, Vol II), the projection period will be not less than the response time for that AFSC. AF/DP will periodically provide MAJCOM DP and Manpower current lists of Category A airman AFSCs and response time.
>
> 5. When MAJCOM Manpower determines it is necessary to increase Category A airman AFSC requirements in less than the response time, it will notify MAJCOM DP of the proposed increase. MAJCOM DP and AFMPC/DPMRA will determine if the proposed increase can be accommodated by appropriate personnel management actions. MAJCOM DP will then notify MAJCOM Manpower of the earliest date which the increase could be accommodated. MAJCOM Manpower will increase the authorizations no earlier than that date. This guidance will be included in a forthcoming change to AFM 26-1.

This message apparently was not included in any change to AFM 26-1 since Change 2 occurred in August of 1974 and Change 3 occurred in February of 1976 without mention of the above message.

The latest attempt at managing change has evolved from the Manpower-Personnel Working Group. This group has established the Skills Management System (SMS) which will identify those AFSCs where short notice manpower changes would adversely affect ATC and Personnel. After identification, these AFSCs will be forwarded to each MAJCOM with a request that manpower changes be minimized. In addition, SMS is proposing to change AFM 26-1. This change, which is below, is similar to that proposed in the joint DPM/PRM message of 17 March 1975.

a. Identify all Category "A" skills and the associated response time, 20 weeks plus length of technical training course.

b. Require full justification and coordination with the manpower and personnel functions and HQ USAF for any authorization increases that occur within the specified response time.

Suggestions for Improvement

Although SMS is an untried system, its development has been the most positive step taken toward management of change. ATC should actively support SMS by:

a. Providing periodic reports on ATC/TT's ability to absorb increased or decreased training demands.

b. Determining monetary and personnel impact of proposed manpower authorization changes.

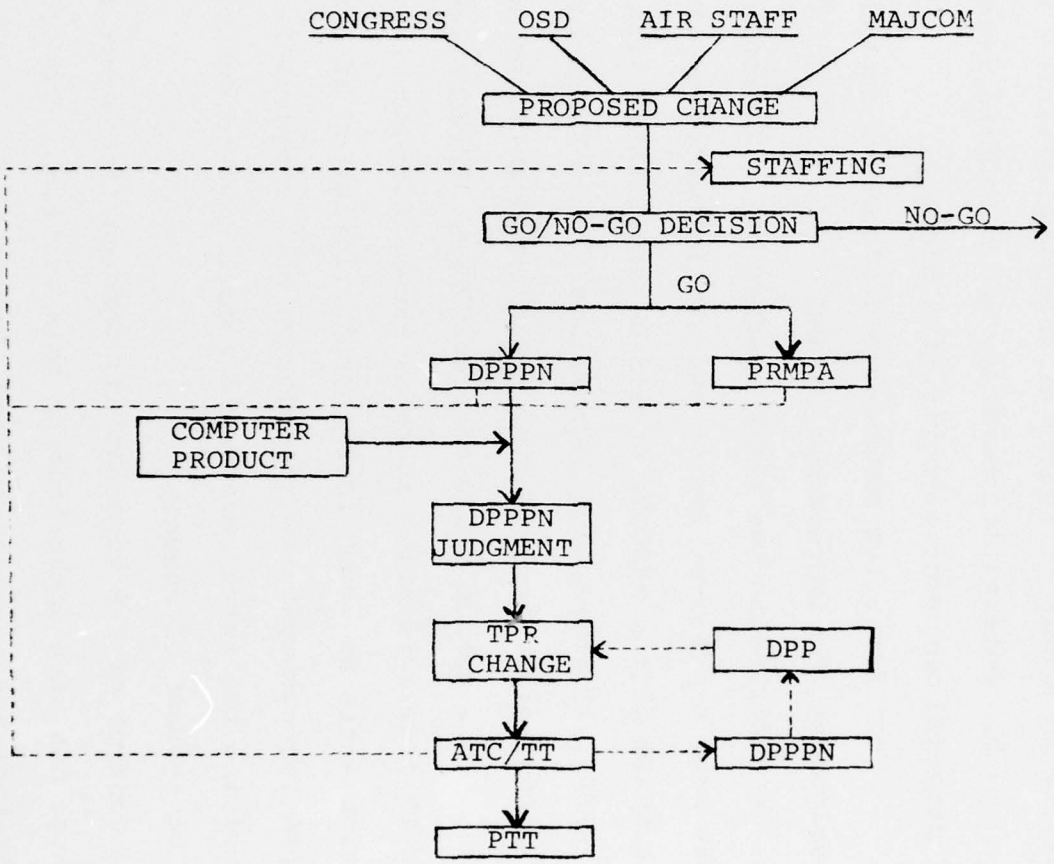
c. Assisting manpower and personnel in the development and improvement of SMS.

In addition to the above suggestion, all proposals that have a manpower impact and are initiated by the Air Staff or the MAJCOMs should be coordinated with AF/DPPPN, AF/PRMPA, and ATC/TT, and should be approved by a central authority prior to an implementation decision. This action would move AF/DPPPN, AF/PRMPA, and ATC/TT from a reactive state as shown in Figure 2 to an active state as shown in Figure 3. Inclusion of a central approving authority in conjunction with coordination involving the three referenced agencies would contribute to management of change.

Control of TPR fluctuations through management of change has been emphasized in this section. Previous TPR studies have also included recommendations aimed at

Figure 3

TPR PROCESS WHICH INCLUDES AF/DPPPN, AF/PRMPA, AND ATC/TT COORDINATION ON PROPOSED CHANGES



managing change but these proposals have not been well received since adoption of such ideas certainly implies reduced manpower flexibility and decreased line authority. The central issue, then, involves a tradeoff between reduced TPR fluctuations and increased rigidity in manpower and line authority. A "bottom line" must be established regarding this tradeoff before management of change techniques, including SMS, can be effective.

Several key questions concerning the establishment of a "bottom line" are presented below:

a. What percent of TPR/training turbulence is generated by sources outside Air Force's control? Is the "remaining turbulence" significant?

b. Is the decrease in manpower flexibility and line authority worth the savings gained from reductions in "remaining turbulence"?

c. If some tradeoff is desirable what will be an acceptable level of "remaining turbulence"?

d. When attempting to reduce turbulence, should the objective be not to exceed a specified turbulence level, or should the objective be to eliminate certain activities which cause manpower fluctuations and result in TPR/training turbulence.

e. Should management of change be secondary to improving reaction to change?

VI. FINDINGS

It is clearly evident that TPR fluctuations and their impact on ATC have been the source of much concern. The number of studies or actions concerning TPR/training turbulence, as shown in Section II, is sufficient evidence of this fact.

The principal cost of TPR turbulence is associated with technical training enlisted instructors. Additional costs, in the form of loss of investment, are incurred when training has been rendered but is no longer needed. Costs associated with base operating support and contract services are considered negligible when compared with instructor turbulence costs. Total dollar cost attributed to TPR variations in FY 1976 is about $8.8 million. An additional cost in mission degradation associated with undermanning was found to be 262 man-years.

The current TPR structure was found to be one of reaction to change where ATC/TT and AF/DPPPN are tasked with providing sufficient lead time in an environment where authorization changes are uncontrolled. Management of change, or control of authorization fluctuations, is cited as being paramount if TPR turbulence is to be significantly reduced. A review of past proposals aimed at managing

change revealed that approval of the Skills Management System has been the most positive step taken in this direction. It is suggested that ATC actively support SMS. A second suggestion is that Air Staff and MAJCOM proposals which have a manpower impact be coordinated with AF/DPPPN, AF/PRMPA, and ATC/TT, and that such proposals be approved by a central authority prior to implementation.

It has not been the purpose of this study to recommend the establishment of a rigid manpower system in order to eliminate TPR/training turbulence, but events of the past 25 years indicate that some form of management of change is imperative if significant reductions in turbulence are to occur.

APPENDIX A

PERCENT OF ENLISTED TECHNICAL TRAINING INSTRUCTOR TURBULENCE ASSOCIATED WITH TPR TURBULENCE

Technical training instructor turbulence (quarter to quarter changes in instructor authorizations) is not produced solely by TPR driven courses. There are, as shown in Table 10, other sources of instructor turbulence. The problem, of course, is determining what percent of instructor turbulence is generated by TPR variations.

Initial estimates can be determined by computing percent of student entries and percent of courses in TPR driven programs. With regard to student entries, Table 11 shows that 63.0% and 58.0% of the FY 1975 and FY 1976 entries, respectively, were associated with TPR programs. Concerning courses, 22.1% of end FY 1975 active courses at the technical training locations were TPR type courses. Of the two measurements, student entries is intuitively more acceptable.

An approach, more rigorous than above, was used to estimate the percent of TPR induced instructor turbulence. This approach relied on the assumption that some amount of non-TPR (i.e., manpower/personnel actions) induced

Table 10

SOURCES OF TRAINING TURBULENCE

1. TYPE 3 AFSC AWARDING COURSES - "TPR"

2. TYPE 2 COURSES

3. TYPE 3 NON-AFSC AWARDING COURSES

4. PERSONNEL ACTIONS

5. MANPOWER ACTIONS

6. RECRUITING FLOW

Table 11

PERCENT OF STUDENT ENTRIES AND PERCENT OF COURSES IN TYPE 2 AND TYPE 3

ENLISTED "ON BASE" TRAINING PROGRAMS

	STUDENT ENTRIES		ACTIVE COURSES
	FY 75	FY 76	FY 75
TYPE 2	5.2%	5.1%	25.1%
TYPE 3 NON-AFSC AWARDING	31.8%	36.9%	52.8%
TYPE 3 AFSC AWARDING "TPR DRIVEN"	63.0%	58.0%	22.1%
TOTAL	100.0%	100.0%	100.0%

instructor turbulence was present in all AFSCs which experienced instructor turbulence. Based on this assumption, and the fact that TPR turbulence does not necessarily imply instructor turbulence, the following arbitrary criteria for non-TPR generated instructor turbulence was established. An AFSC has experienced only non-TPR turbulence if:

a. The quarter to quarter change in instructor authorizations is less than 20% and involves fewer than 10 slots, or

b. The quarter to quarter change in instructor authorizations is less than two slots regardless of the percentage change in authorizations.

Applying the above definition to each instructor AFSC, 150 of 292 AFSCs were found to have met the criteria. These numbers were then compared with the number of AFSCs that experienced TPR variations of 20% of more during the period July 1975 to February 1976. Results are shown in Table 12. Twenty percent was established as a cutoff for significant TPR turbulence by an ATC TPR study(3).

From Table 12, it can be seen that the arbitrary definition for non-TPR instructor turbulence encompasses fewer AFSCs than does the criteria for identifying significant TPR variations. Hence, the resulting cost associated

Table 12

COMPARISON OF TPR AND INSTRUCTOR AUTHORIZATION CHANGES

	NUMBER OF AFSCs WITH CHANGE OF LESS THAN 20%	NUMBER OF AFSCs WITH CHANGE OF 20% OR MORE
TPR CHANGES JULY 75 TO FEB 76	201	91
QUARTER TO QUARTER TECH TRAINING INSTRUCTOR AUTHORIZATION CHANGES MAY 75 TO MAY 76	150*	142*

* ALSO MET CRITERIA INVOLVING NUMBER OF MANPOWER SLOTS

with TPR driven instructor turbulence will be overstated.

The 150 AFSCs identified as experiencing only non-TPR instructor turbulence accounted for $2.2 million or 22% of all instructor turbulence costs in FY 1976. Thus, the remaining 142 AFSCs were considered to have experienced both TPR and non-TPR generated instructor turbulence. Twenty-two percent of this turbulence cost is associated with non-TPR generated turbulence while 78% is associated with TPR turbulence. Hence, TPR turbulence is considered responsible for 65% or less of all instructor turbulence costs as shown below:

$$\text{TPR Turbulence Cost} = (\$12.7M - \$2.2M) \times 78\% = \$8.2M$$

$$\text{TPR Turbulence Cost as a Percent of All Instructor Turbulence Cost} = \$8.2M/\$12.7M = 65\%$$

Sixty-five percent is considered an upper bound due to the large number of AFSCs (142) identified as having experienced TPR induced instructor turbulence during FY 1976.

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